Countryside Survey

Scotland Results from 2007
Key messages

▲ Surveyor at work in the Cairngorms • © *Simon Smart*

Countryside Survey introduction and summary

Countryside Survey is a unique study of the natural resources of the UK countryside. This leaflet provides a summary of the results for Scotland. The survey has been carried out at intervals since 1978 with the latest in 2007. The countryside is sampled and studied using rigorous scientific methods, so that the results from the 2007 survey can be compared with those from previous years. In this way the gradual and subtle changes that occur in the countryside can be studied over time.

There are two main elements to Countryside Survey: the Land Cover Map and the field surveys. The Land Cover Map uses data from satellites to form a digital map of the different types of land cover across the UK and will be published in 2009. Across Scotland, the field surveys involve an in-depth study of a sample of around 200 1km x 1km squares. This leaflet provides a summary of the main findings from the field survey relating to the extent and condition of Broad Habitats and landscape features, condition of freshwater habitats and changes in soil properties.

Sample and data analysis is ongoing, including analysis of soil samples to enable estimation of nutrient and contaminant levels, soil biota diversity and soil function, and freshwater samples to assess change in biological condition relating to stream macro-invertebrates. Both of these will be reported in late 2009. Additionally, an integrated analysis of the vegetation, soil and water data to identify interactions between these different components of the landscape, and how they relate to ecosystem services, is ongoing and will be reported in 2010.

Key messages...

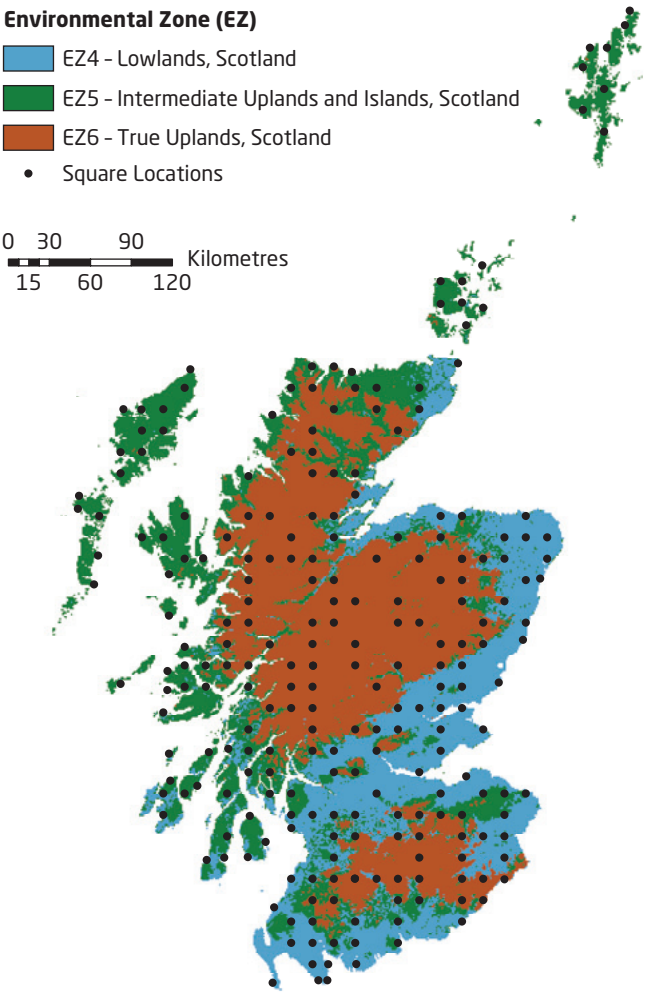
1. **The area of Broadleaved Woodland, Improved Grassland and Acid Grassland Broad Habitats increased between 1998 and 2007. Arable and Horticulture decreased, as did Coniferous Woodland[1]. The area of all other Broad Habitats showed no change.**
2. **Plant species richness declined in most habitats between 1998 and 2007 (~10%) after a period of relative stability between 1978 and 1998, including in linear plots (14%) and areas targeted for their botanical interest (12%).**
3. **Competitive plant species have increased since 1978. Plant species tolerant of harsh environments (stress tolerators) and those associated with open, disturbed conditions (ruderals) have decreased.**
4. **Plant species associated with wetter conditions increased in areas targeted for their botanical interest between 1998 and 2007 and in all plot types between 1978 and 2007. Species associated with shady conditions increased from 1998 to 2007 in linear features and in areas targeted for their botanical interest. Species associated with more fertile conditions decreased between 1998 and 2007.**
5. **The length of managed hedges decreased by 7% between 1998 and 2007. A third of managed hedges were in good structural condition in 2007, with signs of improving condition between 1998 and 2007.**
6. **The extent and condition of drystane dykes (walls) in Scotland, particularly in the True Uplands (EZ6) and the Intermediate Uplands and Islands (EZ5), deteriorated between 1998 and 2007.**
7. **Soils (0-15cm) across all vegetation types became less acidic between 1998 and 2007, continuing a trend observed between 1978 and 1998.**
8. **Carbon concentration in the soil (0-15cm) increased between 1978 and 1998, and decreased between 1998 and 2007. Overall there was no change in carbon concentration in the soil (0-15cm) between 1978 and 2007.**
9. **The mean soil (0-15 cm) carbon content (carbon concentration multiplied by amount of topsoil) across Scotland in 2007 was calculated to be 72t/ha, ranging from 47t/ha in Arable Broad Habitat to 82t/ha in Dwarf Shrub Heath.**
10. **Plant species richness in headwater streams increased between 1998 and 2007. Plants sensitive to nutrient enrichment became more common, suggesting improved water quality. The physical habitat quality of headwater streams also improved between 1998 and 2007.**

[1] potentially due mainly to felling and restocking cycles

Countryside Survey in Scotland

The sampling strategy for the selection of Countryside Survey sample sites is based on topography, climate and geology. For reporting purposes one kilometre squares are grouped into Environmental Zones (EZs) representing geographically different regions. Three EZs have been used within Scotland. These are summarised in *Figure 1* and their distribution to survey square locations is also presented.

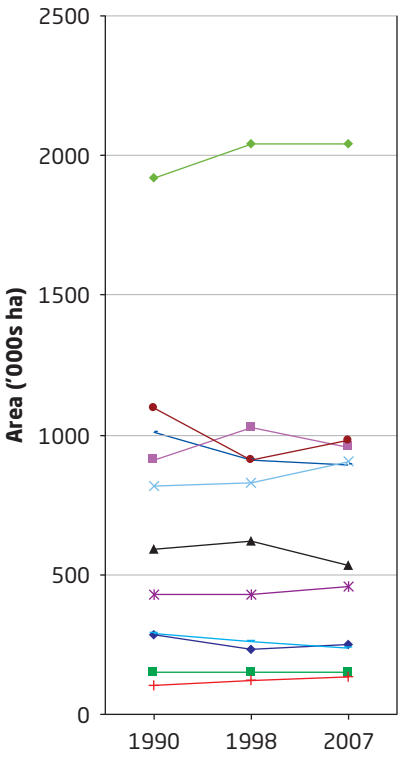
▼ **Figure 1:** The three Scottish Environmental Zones used in Countryside Survey and their distribution within Scotland relative to survey square locations.



▲ Lowland grassland, Keltneyburn • © *SNH*

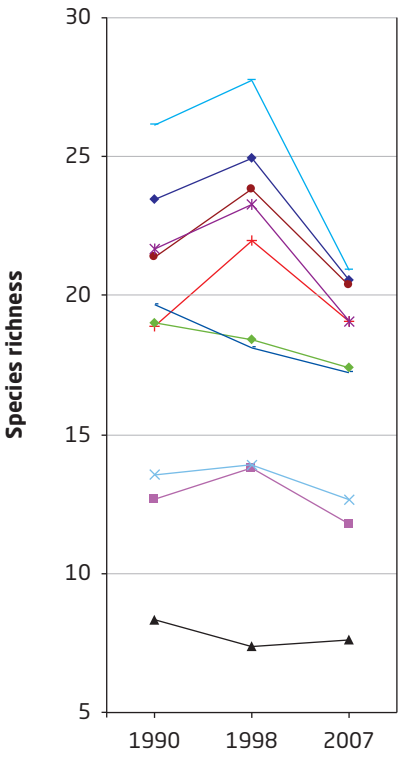
Extent of Broad Habitats

▼ **Figure 2:** Changes in the extents of the most widespread Broad Habitats in Scotland between 1990 and 2007 (* = significant change between 1998 and 2007).

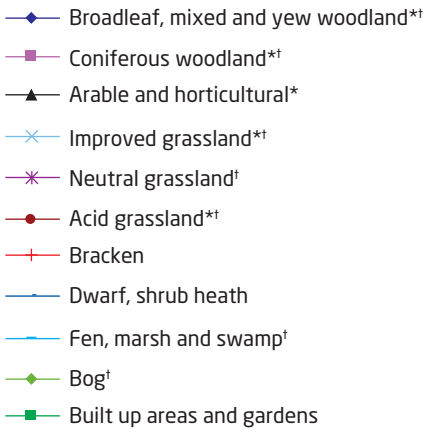


Condition of Broad Habitats – number of species (species richness)

▼ **Figure 3:** Changes in species richness in Broad Habitats between 1990 and 2007 († = significant change between 1998 and 2007).



Vascular plant diversity declined by 10% between 1998 and 2007 across most Broad Habitats. Shade producing and shade tolerant species appear to be out-competing fast growing colonisers in disturbed habitats (such as arable). In open habitats such as grassland, heath and bog, an increase in these species tends to be at the expense of low growing, uncompetitive herbs which depend on a short sward maintained by grazing and low fertility.



Case Study

Which plant species are increasing and decreasing the most?

The three most common species recorded in Countryside Survey plots in Scotland were the same in both 1998 and 2007 *(Table 1)*. Unlike the other species in the top ten, which are characteristic of upland habitats, Yorkshire Fog is a wide-ranging grass species found in many different habitats.

Species that increased between 1998 and 2007 included sedge and rush species which may indicate increasing wetness in a range of habitats *(Table 2)*. Increases in the occurrence of generalist species like Bramble and Nettle are likely to result from decreased management in predominantly lowland habitats, particularly boundary features, road and streamsides.

▼ **Table 1:** The most common species recorded in Countryside Survey main plots in Scotland in 1998 and 2007.

Rank	Scientific name	Common name
1	*Potentilla erecta*	Tormentil
2	*Calluna vulgaris*	Heather (Ling)
3	*Holcus lanatus*	Yorkshire Fog

▲ Tormentil • © *SNH*

▼ **Table 2:** Plant species in rank order showing the largest increase and decrease in frequency of occurrence in Scotland between 1998 and 2007.

Rank	Increasing species		Decreasing species	
	Scientific name	Common name	Scientific name	Common name
1	*Juncus effusus*	Soft Rush	*Poa pratensis sens lat.*	Smooth Meadow Grass
2	*Carex echinata*	Star Sedge	*Festuca ovina agg.*	Sheep's Fescue
3	*Carex binervis*	Green Ribbed Sedge	*Poa trivialis*	Rough Meadow Grass
4	*Rubus fruticosus*	Bramble	*Carex viridula sp.*	Common Yellow Sedge
5	*Urtica dioica*	Nettle	*Bellis perennis*	Daisy

Case Study

Are soils in Scotland recovering from acid rain?

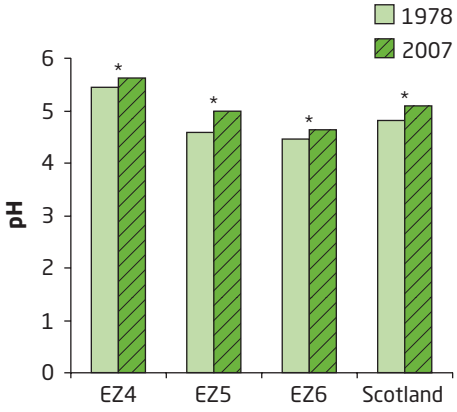
Topography, climate and geology influence habitat formation and soils.

Compared with Great Britain as a whole (no samples in Northern Ireland):

- The mean pH of soils (0-15cm) in Scotland was on average 0.8 pH units lower
- Mean soil (0-15cm) carbon concentration in Scotland was approximately 100g/kg higher
- Bulk density (0-15cm) was 36% lower
- Soil (0-15cm) carbon content (carbon concentration multiplied by amount of topsoil) was 14% higher

Soils were sampled at 0-15cm depth in 1978, 1998 and 2007. Soils in the Lowlands (EZ4) were the least acid (highest pH) ***(Figure 4)***. The pH of soils throughout Scotland increased between 1978 and 2007, consistent with decreases in the deposition of sulphur as 'acid rain' which was a particular issue for high rainfall upland areas with already acid soils.

▼ **Figure 4:** Soil (0-15cm) pH in the three Scottish Environmental Zones and across Scotland as a whole in 1978 and 2007 ('*' = significant difference between years).



▲ Upland bog • © *SNH*

▲ Ploughing, Orkney • © *SNH*

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NIEA Northern Ireland Environment Agency
www.ni-environment.gov.uk

An Agency within the Department of the Environment
www.doeni.gov.uk

Forestry Commission

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Further information on Countryside Survey can be found at:

www.countrysidesurvey.org.uk

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